THE DUODECIMAL BULLETIN

83;(99.)

Bill Before Parliament to

Rescind Unjust Metric Enforcement!

(See page 4)

=Annual Meeting Fri, Oct 6; 11*8(10/6/00) Hofstra University 3:30 PM.=

THE DOZENAL SOCIETY OF AMERICA

(Formerly: The Duodecimal Society of America)

is a voluntary, non profit, educational corporation, organized for the conduct of research and education of the public in the use of base twelve in numeration, mathematics, weights & measures, & other branches of pure & applied science.

Membership dues are $12 (US) for one calendar year. Student Membership is $3 (US) per year, and a life Membership is $144 (US).

The Duodecimal Bulletin is an official publication of the DOZENAL SOCIETY OF AMERICA, INC., ℅ Math Department, Nassau Community College, Garden City, LI, NY 11530-6793.

⊛   ⊛   ⊛

IN THIS ISSUE

RESOLUTION TO BE MOVED IN PARLIAMENT[1]

[Reprinted with permission from The Footrule, Number 5, May 2000, page 2]

Last month's *Yardstick* (p. 2) carried a brief report on the initiative by David Lidington, Conservative MP for Aylesbury, to move a resolution in the House of Commons on 5 April, under the Ten-Minute Rule, begging leave "to bring in a Bill to make the use of imperial weights and measures no longer subject to proceedings for a criminal offence."

We are delighted to report that Mr Lidington's Bill was duly read the First Time, and ordered to be read a Second Time on Friday 9 June. It is hoped to have a statement from Mr Lidington for presentation to our Conference on 3 June. His Bill was supported by these MPs: David Amess, Nick Hawkins, Stephen Day, Nick St. Aubyn, John Hayes and Simon Burns. Here is the text (abridged) of his speech: "F rom 1 January this year, it became a criminal offence - unbelievable though it seems to many millions of our fellow citizens - for a British shopkeeper or market trader to weigh out a pound of apples or meat and to sell that produce to his customers. Any trader who continues to use traditional British units of measurement faces a fine of up to £2,000, the possibility of a term of imprisonment and the prospect, if convicted, of a criminal record, with all that that entails for a person's public reputation. My Bill is intended to put right that absurd and unwanted piece of over- regulation.

UK customers do not want the current law. When I do my weekend shopping ... I am met by local traders and shoppers in my constituency who tell me that they have been made to feel like foreigners in their own country. They do not understand the need for the new law.

To make matters more absurd, that law is not even being enforced by the trading standards officials whose duty it is to do so. The fact that no prosecutions seem to have been made since 1 January shows that TSOs - for good reason - are fighting shy of bringing proceedings, even though they know well that many traders continue to defy the law because that is what their customers want them to do. I agree with those TSOs who have chosen to turn a blind eye; it would be an utterly disgraceful waste of scarce public money were taxpayers' resources to be squandered on such prosecutions.

---

[1] Reprinted with permission from *The Footrule*, Newsletter of the British Weights and Measures Association, Number 5, May 2000, page 2.

Nevertheless, the threat of criminal penalties remains on our statute book. The law has a surreal quality. I can order a pound of mince from the butcher, but the butcher is not allowed to sell me a pound - he has to measure out the metric equivalent.

The absurdity goes further than that. Goods can be described using traditional measures, but may not be priced or advertised thereby. One can ask to buy so many metres of 54-inch curtaining. That is complete nonsense.

If people want to use metric measurements, they should be entitled to do so. That should be a matter for individual traders and their customers to decide. Indeed, examination of the statute book reveals mat as long ago as the 1860s the Metric Weights and Measures Act 1864 allowed the use of metric units for contracts. In 1897, the use of metric units for trade was made lawful. My Bill will do nothing to prevent consenting adults from continuing to use metric measurements if they choose. I am against a law that compels people to use metric units when they would prefer to use traditional British units.

The case is usually made that the new law flows from a European directive. I looked up the key measure -European directive No. 80/181 EEC of 20 December 1979... The key clause states: "Whereas the laws which regulate the use of units of measurement in the Member States differ from one Member State to another and as a result hinder trade ... it is necessary to harmonise laws, regulations and administrative provisions in order to overcome such obstacles."

I draw the House's attention to the key elements: the purpose ... was to prevent the hindrance of trade, and the harmonisation envisaged was in order to overcome obstacles to trade between different member states. I do not see how a criminal penalty on a British greengrocer or butcher who sells loose goods in the high street or town square market has any bearing on free trade within a single European market. The legislation on the statute book flouts the principle of subsidiarity that is enshrined in European treaties and is not proportionate to the problem that the directive purports to identify.

Nor is it true that criminal sanctions are demanded by the directive. The Government have produced no evidence so far that other member states have implemented such sanctions, let alone enforced them.

There was a 10-year derogation from the directive for the sale of loose goods and goods weighed at the point of sale. There is no reason why the Government should not have sought to renew it and extend it much further. Indeed, a derogation was agreed by the Community for packaged goods because that was essential for exports to the United States, not only from Britain but from every country in the EU. The US insists on dual marking - metric and imperial - for prepacked goods for sale in shops.

Ministers could have sought a similar derogation for loose goods for sale in Britain, but they chose not to do so. They have admitted that they did not even discuss the idea with the Commission, or with other member states....

My Bill would abolish criminal penalties for a trader who uses pounds, ounces, feet, inches and other traditional British units of measurement by biting on the Weights and Measures Act 1985, which lays down penalties for use by traders of units other than those prescribed by law.

If traders and customers want to use metric measurements, they should be free to do so, but the same freedom should apply to people who prefer to buy and sell goods in the traditional British way. The law is an example of unnecessary and over-burdensome regulation. It needs to be changed."

⊛   ⊛   ⊛

Visit our website currently at:

http://members.xoom.com/harvestevia

● Down load many interesting articles

  ● Link to other related sites

    ● Obtain materials for research, reports and student projects

---

LETTER TO MR STEPHEN BYERS,
Secretary of State for Trade and Industry

[Reprinted with permission from The Footrule, Number 5, May 2000, page 2]

Text (abridged) of a letter dated 24 April from our Director to Mr Stephen Byers, Secretary of State for Trade and Industry, to which a response is awaited:

The facts of the present, increasingly intolerable situation are beyond dispute. The UK Weighing Federation estimates that some 38,000 retailers — about 40% of the entire independent sector — are still trading in imperial units, and complains that its members are holding in stock tens of thousands of new metric machines and adaptation kits for which there is no demand. Yet there is no sign of a single prosecution anywhere. Local authorities will not prosecute because (a) they have no incentive to do so, (b) they resent being burdened with this odious responsibility and (c) the criminalizing of customary measures is intensely unpopular. The European Commission says to each Member State, "That's the law, now you enforce it", whereupon central government says to local government, "That's the law, now you enforce it"! But no local Council wants to make "metric martyrs". Yet only three months ago, the Weighing Federation and Government spokesmen were confidently predicting that by the end of April "the backlog will have been cleared"; when it had been obvious, ever since 1st January, that no Council would prosecute any popular, honest, local trader during the weeks prior to local Elections on 4th May, and, furthermore, that by then the sheer scale of public resistance and media hostility would render penal sanctions inoperable.

For the number of rebel retailers is growing fast, those that had converted by order of their local Trading Standards Officers realizing that with no risk of prosecution they are safe in reverting to customary measures to the satisfaction of the vast majority of their customers. Besides, many are switching back simply because they cannot afford to sustain the loss in trade suffered immediately following metric conversion. How ironic that, according to many TSOs, the only cases that could compel them to institute legal proceedings would arise from specific complaints by traders who have converted that they had lost trade to competitors who have not! So it is the officially presumed consumer preference for imperial measures that is the sole justification for making their use a criminal offence! How ironic, too, that candidates from all parties in the current Council Election campaign are jostling for the privilege of being photographed by the local press while posing in front of a prominent non-metric trader's shop and shaking hands with the proprietor!

Frustrated by the failure of Councils to prosecute, many TSOs are "throwing away the book" and attempting to coerce traders into metric conversion by resorting to various forms of harassment, intimidation, deception and strong-arm methods. Very few of the dozens of purported "Infringement Notices" sent to BWMA by distressed shopkeepers are valid - they are indeed alarming but ultimately worthless threats - because many TSOs see no sense in granting 28 days notice in the proper form if unyielding retailers are effectively immune to prosecution. Every day brings us more first-hand accounts of appalling behaviour by TSOs towards vulnerable small shopkeepers and their families. Either you or the Home Secretary must be legally liable for this atrocious misconduct.

However, my present purpose is wholly conciliatory and constructive. May I, please, first enquire: are you planning or contemplating any new proposal in order to remedy or at least relieve the situation? Short of the ideal situation, which is repeal of the offending EC Directives, you could with comparative ease — as BWMA has for several years advocated — deregulate weights and measures altogether, relying instead on the UK's rigorous codes of anti-fraud and consumer protection legislation. For it is impossible to commit any offence even remotely related to weights and measures that does not violate one or umpteen of those existing statutes. The effect would be to leave metric and imperial units as equally authorized, in accordance with the relevant provisions of the 1985 Act. The notion of deregulation may horrify politicians but it really is the only sensible answer to the metrication problem.

But if relinquishing this area of state control is unthinkable, then you might in the short term declare an official moratorium, whereby the regulations remain in place (so avoiding conflict with your masters in Brussels) but are not enforced — i.e. the penalties for infringement are suspended sine die - akin to the Canadian compromise. This would at least free shopkeepers from TSOs' persecution and relieve TSOs of an invidious duty - and also greatly boost your government's electoral support!

In the deplorable absence of any such reform, however, my second question must be: do you, without further delay, intend to induce prosecutions of defiant retailers, either by nominated Councils or directly by the Crown? Obviously, you must exercise a positive choice, either to introduce one of the suggested reforms or to enforce the current regulations. It is scandalous that at this moment there are hundreds if not thousands of honest shopkeepers who have been officially informed that they are guilty of criminal offences yet cannot

obtain from the authorities any decision as to whether or not they are to be prosecuted. That state of affairs is an outrage and against natural justice. You cannot permit it to continue. So please tell me, which is it to be: either (a) repeal/relaxation or (b) enforcement?

But if you choose enforcement, then you raise the inescapable issue of the legality of the whole process of compulsory metrication. I must advise that, in conjunction with our supporters, BWMA would promote as a test case any prosecution of an honest retailer who is charged simply with the offence of continuing to trade in imperial units in accordance with customers wishes, so as to prove that the regulations are unlawful (ultra vires, null and void); and we are assured by several eminent Counsel — specialists in constitutional and administrative law — that we should win. Granted that nowadays even the Magistracy is politicized, it is conceivable that in the first instance we might lose, in which unlikely event we would certainly appeal and pursue the case as far as necessary until successful. One thing is certain: any prosecution in the coming months — whatever the outcome — can only inflict damage on your government as the next General Election approaches.

Alternatively, it is possible that after 4th May some new local Council, exasperated on inheriting this situation, might bring a prosecution to resolve the issue (especially if controlled by one of the opposition parties) and, having had it thrown out, leave your government to deal with the resulting disaster. That is another danger that might arise from failure to adopt one of our suggested reforms quickly.

Furthermore, I must advise that, if neither your Department nor any local authority takes any initiative, then BWMA (and its supporters) will take direct action at law by seeking an Order from a Judge requiring one of the few Councils that have served valid Infringement Notices, and taken no action following expiry of the 28 days, to proceed with a prosecution. We cannot suffer the regulations merely to become a "dead letter", with nothing resolved.

Finally, it must be added that any dispute over the regulations' legality does not affect the urgent, immediate issue of their practical unenforceability. Even if, notionally, the regulations were lawful, they would still remain unenforceable for all the reasons mentioned earlier. Besides, legal proceedings to settle that dispute would take a long time, whilst the situation affecting tens of thousands of retailers continued to deteriorate. I have done my best here, as BWMA has always done, to avoid a confrontation on that issue, as we would much rather

seek to influence the government in favour of taking expedient, remedial action on its own account. We shall relish a legal challenge, and mount one if you leave us no choice, but would you not be far better advised — politically as well as for the sake of all concerned — to tackle the problem at source?

I look forward to your considered reply - particularly in response to my specific questions - with utmost concern.

❀   ❀   ❀

OUR BRITISH ASSOCIATES

The Dozenal Society of Great Britain
Walnut Bank, 29 Underhill Moulsford, Oxford OX10 9JH, Great Britain
Telephone from US:
A. Whillock, Information Sec.   (After hours) 011-44-149-165-1448
A. Denny, Public Relations   (After hours) 011-44-181-947-9200
R. Carnaghan, Advisor   (After hours) 011-44-192-324-1548

The Yardstick, published by the *British Weights and Measures Association*
45 Montgomery Street, Edinburgh EH75JX, Great Britain
http://users.aol.com/footrule

PROBLEM CORNER

Jay L. Schiffman
Rowan University, Camden Campus

The following dozen number theoretic problems are invited to be solved by our readers. A computer with a CAS Package is very helpful. We will print complete solutions from contributors in future issues as they are received.

Problem 1:   Consider the repunit sequence 111111...in various number bases from binary to hexadecimal inclusive. Find the number of 1's that produce prime numbers.

Problem 2:   Consider the first gross of twin primes in various number bases from binary to hexadecimal. A twin prime pair consists of two odd primes that differ by two such as 3 and 5.

Problem 3:   Examine the first three dozen outputs for the sequences N! + 1 and N! - 1 in bases dek, hexadecimal and our favorite number base. (N! stands for n factorial.) Determine all prime outputs generated and furnish the prime factorizations for the composite outcomes.

Problem 4:   Consider the Fibonacci sequence recursively defined as follows: $FIB(1) = FIB(2) = 1$ and $FIB(N) = FIB(N-2) + FIB(N-1)$ for $N \geq 3$. Determine the initial dozen prime outputs in the decimal, duodecimal and hexadecimal bases as well as the number of digits these integers contain. Can you provide us with the prime factorizations for the first gross of Fibonacci Numbers in the above bases?

Problem 5:   Consider the Lucas sequence which is Fibonacci-like in character with the exception that the first term of the sequence is 1 and the second term is 3. Determine as many prime outputs as possible in these number bases and furnish the prime factorizations for the first gross of Lucas numbers in the above bases?

Problem 6:   Examine the initial dozen perfect numbers (those numbers that coincide with the sum of all their factors except the numbers themselves) in bases dek, duodecimal and hexadecimal. Do you see any patterns associated with these numbers in their respective base representations?

Problem Corner

Problem 7:   In Euclid's proof demonstrating the infinitude of prime numbers, one is led to consider the equation $N_n = p_1 \times p_2 \times p_3 \times ... \times p_n + 1$ where $p_1 = 2$, the first prime, $p_2 = 3$, the second prime, $p_3 = 5$, the third prime and so forth up to p_n, which is claimed to be the greatest and leads to the contradiction that establishes the theorem. Determine the initial dozen outputs which are prime and those which are composite in bases dek, duodecimal and hexadecimal and provide the prime factorization for the composite integers.

Problem 8:   Construct a table containing the first great gross of primes in bases dek, duodecimal, octal and hexadecimal.

Problem 9:   Construct a table containing the first gross of triangular, square, tetrahedral, pentagonal and hexagonal numbers in bases dek, duodecimal, octal and hexadecimal.

Problem ✳:   Prime numbers of the form $2^{(2^N)} + 1$ are called *Fermat Primes*. It is well known that primes are a consequence of the initial five inputs. No other primes have been found. Represent these primes in the four number bases dek, duodecimal, octal and hexadecimal and generate the first few composite outputs with their prime factorizations if possible.

Problem #:   Factor the decimal numeral N = 808,017,424,794,512,875, 886,459,904,963,710,757,005,754,368,000,000,000 into primes. This number is the base dek order of the *Monster*, a set of symmetries in a space of 196,883 decimal dimensions. Express this numeral in the other three number bases mentioned in the previous three problems and provide the prime factorizations in these bases.

Problem 10:   Recall that the *Mersenne numbers* are defined by the expression $M_p = 2^p - 1$ where p is prime. Construct a list of Mersenne numbers for the first gross of primes, identify those which are prime and furnish the factorizations of those which are not prime where possible. Do this in the four different number bases discussed in the last problem.

<p align="center">❀   ❀   ❀</p>

<p align="center">Remember — your gift to the DSA is tax deductible</p>

BIG BROTHER
FORCES AWKWARD DECIMAL METRICS ONCE AGAIN

In the May/June 2000 issue of the *News Bulletin* of the National Council of Teachers of Mathematics re read that, Canada adopted the metric system long ago and immediately *mandated* that all school curricula use the metric system *exclusively.*" (Emphasis added.)

Why is that no country, *not one*, ever freely adopted this unnatural system. Is it true that all humans (except for a few in power) are too stupid to know what is good for them? Or perhaps maybe it is because decimal metrics is simply not such a good system after all.

Of course for any change there will be some resistance, but after all these years wouldn't you think that somewhere some peoples would be freely adopting this so called better method?

The same News Bulletin states that, "Conversion between metric units is facilitated by the *decimal* nature." (Emphasis added.)

Shouldn't we expect better from mathematics teachers? Any student with a rudimentary knowledge of number bases & measurements knows that the ease of conversion is due to aligning one's number base with one's measurements, and not to any property of inconvenient decimals.

Why change the measurements created by practical people such as carpenters and grocers to align them with the biological accident that we counted on ten fingers?

Why not, instead, retain the handiness of natural measures such as foot & inch, gross & dozen, Troy pound & ounce, year & month, etc. along with the highly factorable base twelve? This offers us all the advantages of the ungainly decimal metric system & in addition allows us to preserve the convenience of the common fractions ½, ⅓ & ¼.

<p align="center">✿   ✿   ✿</p>
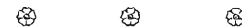
The **DSA** does NOT endorse any particular symbols for the digits ten and eleven. For uniformity in publication we use the asterisk (*) for ten and the octothorpe (#) for eleven. Whatever symbols are used, the numbers commonly called "ten", "eleven" and "twelve" are pronounced "dek", "el" and "do" in the duodecimal system..

When it is not clear from the context whether a numeral is a decimal or a dozenal, we use a period as a unit point for base ten and a semi-colon, or Humphrey point, as a unit point for base twelve. Thus ½ = 0.5 = 0;6.

THE FUTURE OF COUNTING AND MEASUREMENT
(ARTICLE EIGHT)

Ian B. Patten

Some say we will have to deal with decimal counting for generations to come. I do not believe it. When a better mousetrap has been invented, history shows we never fool around long with the old.

Little recognized is the fact we have two different decimal counting systems in the higher numbers. This can be rectified in dozenal counting. We count the same up to a hundred million (100,000,000) the world over. Thereafter, the naming in the Anglo-German system is correct, in the American system, incorrect. Explaining the American system in an article entitled "Arithmetic or Lunatic", Tom Pendlebury says:

"...it goes up not by millions but by thousands. The calamity is, it steps off on the wrong foot, for it is the THOUSAND MILLION, that is, the thousand, thousand, thousand (the third power) which is called a Billion (9 noughts). A thousand "billion" is called a "trillion" (12 noughts) (The Anglo-German billion)...All the even prefixes "bi-, quadr-, sext-, oct- etc. are used for odd powers, and all the odd prefixes "tri-, quint-, sept- etc. for the even powers! This leads to a very queer arithmetic such as: a billion billion is not a quadrillion but a quintillion, yet that quintillion does not mean the fifth but a sixth power of a thousand! As though "two and two" were "five" which really means six..."

Under the heading CORRECT NUMERATION, he writes: "The very purpose of these words (million, billion, quadrillion etc.) is quite simply to name the higher numbers, that is, to tell us how many noughts to put. Failing that, they are useless... (It is) quite straightforward: Billion = million million. Trillion = million, million, million. Quadrillion = million, million, million, million, that is, a billion billion, just as two and two make four, and so on. Since a million has six noughts, a quadrillion has four times six, that is, twenty four. A sextillion has thirty-six noughts..."

Billions of dollars are exchanged across the world daily, and there must be confusion in international banking circles over the two current systems.

Another area in decimal where we have an aggravating difference is in systemic fractions. The metric world uses a comma between a whole number and a decimal fraction. English-speaking countries use a point, either on the base line or halfway up, and commas are used to separate whole numbers by thousands (every three digits), whereas established metric users employ spaces. At present, dozenal fractions are separated from whole numbers by a semi-colon, but I hope we appropriate the point when we change.

In measurement, there are half a dozen dozenal metric systems using a conventional metric approach, but I feel only the modular system can be the blueprint for the future. Interestingly, Ralph Beard, a founder of the DSA, came up with a version of the modular system 20 years before Peter Thomas. He, too, envisioned a 1728-yard mile, but although he kept the foot and inch with their related ratios, his primary unit was the yard. He favoured a cubic palm (3" cubed) for a pint which would weigh a pound of water. This pound would be just 3% lighter than avoirdupois. A 27 cubic inch pint would give a 54 cu in quart and a 216 cu in gallon contained in a cube with 6" sides. The cubic foot would hold 8 such gallons. This, he claims, would restore the measures to their original ordered sizes.

It is not written in stone, however, that the values for the foot, hand, inch and yard must remain the same as today. If marginal changes suited to science would improve the system and the units remain practical and human-related, we should consider them, because if we are to adopt a new system it had better be the very best with all the expense change will involve, especially in re-surveying the globe.

In a fascinating article entitled "The 10,000-Year-Old Inch", Nigel Corrigan writes: "In contrast to this arbitrary measure (the metre), the Inch has a natural harmony not only with time and the size of the Earth but also with geometrical constants such as Pi." He then explains the tie-in between the inch, cubit and Pi:

"A radian is...subtended by an arc equal to the radius of a circle. This angle is 57 degrees 17'48.8". For most applications 57.3 degrees is used.... Pi can be approximated by dividing one radian by the number of inches in a cubit: 57.3 divided by 18.24 = 3.141... (and, of course, the number of inches in a Cubit can be found by dividing one radian by Pi: 57.3 / 3.141 = 18.24.)

"Could 18.24 be as much a numerical constant as Pi? A definite relationship does exist between 18.24 and the 360 degrees of the complete circle: 360 / (18.24 x 2) = 9.868, whose square root is 3.141, Pi. Another: 18.24 x 180 = 3,283, whose square root is 57.3, a radian."

If we brought this 18.24" cubit into the modular system for its scientific value, the changes to the other small length units to maintain the proper ratios would be minimal. The foot would be 0.16" longer, the inch 0.01333", the yard less than half an inch (0.48"), and the fathom less than an inch (0.96") to make it 72.96".

There is an added bonus here. The modular mile would tie in nicely with the nautical mile. The Egyptians figured the Earth rotated at the equator 1000 cubits per second, and 4,000 cubits made the nautical mile (n m). At 18.24" per cubit, this translated to 1000 X 18.24 / 12 = 1520 ft per second, or 6080 ft per n m. Unfortunately, metric arrogance demanded a figure of 6076.1033 ft to coincide with their designation of 1852 metres, nothwithstanding metres were useless in navigation.

Taking 21,600 n m as the equatorial circumference, this made for 21600 x 4000 = 86,400,000 cubits, which relates to the seconds in a 24-hour day in a 1000 : 1 ratio. If we make the foot an exact 3 : 2 ratio with this cubit, the inch 18 : 1, the yard 1 : 2, and the fathom 4 : 1, we have a direct link to both time and distance in navigation in the modular system. There would accordingly be 3 / 2 x 86,400,000 = 129,600,000 feet in the circumference. This would render a nautical mile of 6,000 ft, 2,000 yd, and 1,000 fathoms. All these are nice round figures in decimal, and they would be in dozenal counting, too.

This modular mile would be 2000 - 1728 = 272 yards short of the nautical mile. It would be 86.4% of the n m.

This option leads us to another: equating the modular mile with the nautical, air, or geographical mile itself. No longer would it be arbitrary like the statute mile and the kilometre, but in complete consonance with the most necessary fundamental unit on Earth coupled with knots or nautical miles per hour used by ships and aircraft. With our ever-increasing involvement in space operations it behooves us to use the same pertinent measures on land as we do at sea and in the air.

While the nautical mile is recognized as 1.15 st. mi, there are 6076.1033 / 5184 = 1.172087827 modular miles per n m. If my calculations are correct, here is what would happen to the small length units in equating the modular mile with the sea mile:

The inch would increase by just over 1/6" (0.172087827"). The foot would

increase just over 2" (2.06505392") to 14.06505392 current inches. The yard would increase to 42.1951677" (just under 3'6-1/5"), while the fathom would become 84.39032354" (just under 7'0-2/5").

This modular / nautical mile would have exactly 5184 / 6 = 864 fathoms (600 dozenal). With dozenal terms in parentheses, 1 cable could equal 144 ft (100) for 36 cables (30) per n m. Perhaps even better would be a 144' (100) ft length for 6 cables per n m. The statute mile has 880 fathoms, but the nautical mile has 6076.1033 / 6 = 1012.683883 fa.

The increase in the inch would be very minor. A foot of about 14 current inches (divided into 12 inches, of course) would equate the foot round in such diverse areas as Poland, Italy, and China and equal half a bracchia or arm length favoured by cloth workers. So this would still be an ergonomic unit.

The 6" extra on the yard would make for a large pace or stride. The extra foot on the fathom would equate a man-depth with his arm extended upward. 6 feet would no longer be the ideal height of a man but rather depict an extreme, such as a basketball centre. 5 feet in the new terms would actually equal 5 / 6 of 7 current feet, or 5.8333', which is 5' 10", an ideal height for a male. So 5 to 6 feet in these new values would represent average to tall men; between 4 and 5 feet would be the range for most women and many men.

Checking Le Corbusier's figures for the human body at the decisive points of its occupation of space in his modular schematic of a man with one arm upraised, I found an amazing similarity to the figures above. He used 108 cm for the midriff point, which is 42.52", or just over 3'6-1/2". The tip of the upraised arm was double this figure at 216 cm, which is 85.04", or just over 7'1". The top of a man's head registered as 175 cm or 68.8976" or 5.74147 ft = 5'9" approximately. This, quite reasonably, was the average height he chose for a man. The widest disparity in each of the three comparisons is only about an inch!

In surveying, we would enjoy a navigation-compatible modular acre, which, bettering the statute acre, would have square sides. Our first impulse would be to create one with sides of 144 yards, (100), but if this is too large, a better option would be a division into four with sides of 72 yd (60). We must be very sure of what we want before going to this expense. [Another option: a 144' (100) sided square acre - 1296 (30²), if too small.]

What we should be doing is calling a 6-foot man 60 inches instead of 72", eliminating the conversion into a near-useless decimal counting mode. Interestingly, the Soviets used a dozenal metric system in navigation for their submarine fleet worldwide, stemming from Jean Essig's navinaut of 6336 ft, his duodecimal metre of 44" x 12 x 12 x 12, so dozenal metrology is nothing new. We must get the political whores, breaucratic fascists and sundry intellectual perverts out of this field and stop brainwashing our children with lies. Legislation will never change the laws of metrology. Future generations must be free to pursue scientific truth. Man was never made for measurement, measurement was made for man.

END OF ARTICLE EIGHT

Editor's Note: Ian's article is the last in an eight part series. We look forward to receiving and publishing the others.

⊛   ⊛   ⊛
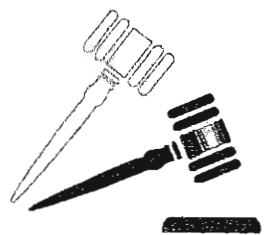
Join Us at

Our Annual Meeting
At

Hofstra University in Hempstead LI NY
Room 246, Business Development Center

On Friday, 6 October 11*8(2000.)

At 3:30 PM

For Further Information Contact Gene Zirkel At:

(631) 669 0273 or
genezirk@mindspring.com

NUMBER BASE CONVERSION
WITH A CAS (Computer Algebra System)

Jay L. Schiffman
Rowan University, Camden Campus

Many graphics calculators possess the capacity to convert between the decimal, binary, octal, and hexadecimal bases. The TI-85 and the TI-86 enjoy this flexibility in addition to performing the fundamental arithmetic operations in these bases using the BASE KEY. The TI-89 converts between the binary, decimal, and hexadecimal bases, performs arithmetic in these bases as well as factors integers and determines if an integer is prime or composite. Since the binary, octal, and hexadecimal number bases all involve powers of two, it is easy to manipulate between these bases by converting individual digits. Unfortunately, for our purposes, the calculator giants do not appear to be amenable to include base twelve among their base conversions.

The CAS program **MATHEMATICA**, a copyright of **WOLFRAM RESEARCH, INC.** comes to the rescue. Its Number Theory package is superb. The range is almost limitless in the sense that it is comfortable in working with integers possessing several dozen decimal digits in perfoming such tasks as factorization, determining primality, and converting from base ten to and from any base from bases two through thirty six. It is quite simple as I will now explain in the aforegoing paragraphs.

The command IntegerDigits (all one word) will convert a decimal numeral to the equivalent numeral in another base. For example, if one wishes to convert the decimal numeral 8128 to dozenals, merely type IntegerDigits[8128,12] (no spacing) followed by Shift Enter (Together). The result given in duodecimals is {4, 8, 5, 4} and one reads the resulting numeral from left to right. We write the numeral as 4854;. In the brackets, the first argument connotes the decimal numeral (8128 in our example) while the second argument refers to the base we are coverting to (12 in our example), with alas all the numerals in decimal. If one converted the decimal numeral 47 to dozenals, the input is IntegerDigits[47,12] with an output of {3, 11} which we write as 3#;. To convert 496 to binary, type IntegerDigits[496,2]. The result is {1, 1, 1, 1, 1, 0, 0, 0, 0}, which is written 111110000_2. As a final example, we convert the decimal numeral 65536 to hexadecimals. Type IntegerDigits[65536,16]. Our result is {1, 0, 0, 0}, which we express as 1000_{16}.

Suppose we have a numeral in a base other than ten. MATHEMATICA employs the code FromDigits to convert to a decimal numeral. To cite an example, suppose one desires to convert the dozenal numeral 43*#; to base ten.

Input the code From Digits[{4,3,10,11},12] followed by SHIFT ENTER (together) and obtain as an output 7475 which is the equivalent Decimal Numeral. Notice that all the digits need to be entered in set braces as decimal numerals in the first argument with the base we are converting from as the second argument expressed in base ten. This command is considered the reverse of the Integer Digits command discussed earlier. To cite two additional examples, to convert the binary numeral 1110001_2 to decimals, type From Digits[{1,1,1,0,0,0,1},2] as the input and obtain 81 as our output. Finally to convert $1AB_{16}$ to decimals, type From Digits[{1,10,11},16] as our input and obtain the decimal output 427. Recall in Hexadecimals that A = 10 and B = 11.

Number base enthusiasts will enjoy working with the software package **MATHEMATICA.** In addition, the program will determine the length of the integer digits possessed by any integer in the sense of the cardinal number. Until the calculator industry comes around and views the value as well as the sheer beauty of working in the dozenal system, **WOLFRAM RESEARCH, INC.** has furnished us with a very valuable resource for our purposes.

❁ ❁ ❁

ERRATA

In the article The Role of Congruences to Prove Hexadecimal Divisibility Tests that appeared in Volume 41;(49.), an error was detected by the author on page 10;(12.). In Theorem 4, part (4), the letter B should be the letter C and the text should thus read (4). An integer n is divisible by 4 iff the last digit, a_0 is either 0,4,8, or C. We apologize for this error.

TWELVE

Did you know the following things about the number Twelve?

Twelve is the smallest abundant number. A number is abundant if the sum of all the divisors except the number itself is larger than the number. (1+2+3+4+6=14;>10;)

Twelve is the number of months in the year and the number of signs of the Zodiac. There were twelve apostles of Christ.

Twelve is the number of inches in a foot and numbers on a clock. In 1160;(1944.), The Duodecimal Society was formed in New York with the purpose of proposing that we switch to base twelve in all scientific work.

Twelve is divisible by both the sum of its digits (making it a Niven number) and the product of its digits.

Twelve is a semiperfect number. A number is semiperfect if some subset of the divisors less than it sum to it. (10;=1+2+3+6)

Twelve is an integer-perfect number. A number is integer-perfect if you can make choices of + or - in front of all the divisors less than it and get the number. (10;=1-2+3+4+6)

⊛ ⊛ ⊛

The above was discovered via several links on our DSA web page at http://members.xoom.com/harvestevia
by clicking on: [Links]
then: http://www.greenheart.com/billh/twelve.html By Bill H
and then: (7) Eastern Kentucky University MCSC Department 12

and is reprinted here with permission

⊛ ⊛ ⊛

You will also enjoy the well done piece by Bill H.

ANTI-METRICATION CAMPAIGN

United Kingdom Independence Party (UKIP)

Office of Jeffrey Titford, M.E.P.
MEMBER FOR EASTERN COUNTIES
Rooms 1 & 2, Rochester House, 145 New London Road,
CHELMSFORD, Essex, CM2 0QT
Tel: Chelmsford (01245) 266466 or 251651
e-mail address: ukipeast@globalnet.co.uk
Fax: 01245 252071
ISDN line: 01245 251427 January 2000

JEFFREY TITFORD M.E.P.'S ANTI-METRICATION CAMPAIGN:

January Update: This campaign up-date has been prepared on 4 January 2000. Events have been moving rapidly over the past fortnight, and this leaflet is by way of an up date. Please see our previous three campaign leaflets dated October, November and December which give full details of the reasons the campaign was launched, and the practical help on offer from Jeffrey Titford M.E.P. and his team in Chelmsford.

Recent Developments: More free legal help offered! We now have three barristers willing to offer free legal representation to any trader in Imperial measures who may be prosecuted by Trading Standards Officers.

There has been considerable interest in UKIP's anti-metrication protest, to take place on Tuesday, 11 January 2000, at 10.00 a.m. to 11.00 a.m., at the shop of Dave Stephens, Mandy's Chop Shop, 59/61 Broadway, LEIGH-ON-SEA, Essex SS9 1PH. If you receive this campaign up-date before then, please do ask for further details. The plan is for Jeffrey Titford M.E.P. to publicly buy a pound of beef and a pound of sausages from Dave Stephens, who will be marking up his meat in Imperial measures only. Jeffrey will also receive a petition of around 3,000 signatures collected by Dave Stephens opposing compulsory metrication. Jeffrey will hand that petition in to Kim Howells, Consumer Affairs Minister at the Department of Trade and Industry. If you are reading this campaign up-date after 11 January please contact us for information on how the protest went.

A major retailer in the West Country, Trago Mills, has publicly joined the anti-metrication campaign. Their Managing Director, Bruce Robertson, has issued a public challenge to Trading Standards Officers in Cornwall and Devon to prosecute him for continuing to sell in pounds and ounces. He has the resources for a fight and is publicising the anti-metrication campaign in newspapers throughout the West Country.

A special one-day protest is planned by Dr Richard North and his trading company, set up especially to defy the Government's metrication laws. Dr North is UKIP's political advisor to the U.K. Independence Party in Brussels, is a former employee of the Ministry of Agriculture and Fisheries, and a well-known writer on the European Union. His trading company will sell in pounds and ounces all day Sunday, 16 January and further protests are planned by Dr North.

Trader in blinds and fabrics, Mrs Jose O'Ware of Enfield, North London, is claiming victory in her campaign to be allowed to continue to sell blinds and fabrics in yards, feet and inches. The local Trading Standards Officer has backed down and allowed Mrs O'Ware to continue to sell in yards, feet and inches, because he says she is selling in "sizes".

This is not strictly true, she sells in feet and inches, if asked to by customers, and not in sizes as such. She makes up blinds according to measurements taken by customers of their windows and doors in feet and inches.

Mr Tony Howard continues to sell in gallons rather than in litres from his pumps on Exmoor (Somerset). He will continue to defy the Government's instructions to sell in litres and has also publicly challenged Somerset Trading Standards Officers to take him to Court.

More details are coming in of traders wishing to continue to sell in Imperial measures of one kind or another. Details of those can be given to the media on request.

There is evidence that continuing to trade in Imperial measures may be giving traders a commercial advantage. Tony Howard has had an increase in business since the general public knew he was continuing to sell in gallons. Similarly, Dave Stephens has had additional customers because of his stand on pounds and ounces. We believe some traders will revert from selling in metric units only to selling in Imperial measures as well when they realise that there is a commercial advantage to doing so.

We now have a full, 27-page, legal Opinion from Michael Shrimpton, Barrister at Francis Taylor Building, Temple, London. This will be sent free of charge on

request (although small donations towards expenses are appreciated). This legal Opinion states quite clearly that because the Government passed the Weights and Measures Act in 1985 which specified that traders could trade in both metric units and Imperial units, it is *ultra vires* - that is, in plain words, illegal - to try to make selling in Imperial measures a criminal offence by later, 1994, Regulations. Michael Shrimpton has also offered to help the campaign and is available for media interviews on the legal issues, if required.

It would appear from the latest information to hand (yesterday) that Trading Standards Officers are now considering a six-month "freeze" on taking traders in Imperial measures to Court. This contrasts with their statements before 1 January 2000 which were that any trader continuing to sell in Imperial measures after 1 January 2000 would be considered "a metrication martyr" and suffer the consequences of martyrdom! Indeed, Mr Chris Howell, Director of the Institute of Trading Standards Officers, published a letter in the "Daily Telegraph" in November in which he warned "metrication martyrs" of the "heavy price" they would have to pay for not converting to metric measurements!

Practical Help: For those reading about our campaign for the first time, here is a summary of the assistance available to traders wishing to defy the Government's metrication laws:

Free legal representation by a barrister.

Financial assistance towards other legal expenses.

Financial assistance towards any fines imposed by Magistrates Courts. (The financial assistance comes from UKIP's special fund for victims of the European Union, funded by European Union allowances paid to Jeffrey Titford M.E.P. and the other UKIP M.E.P.s).

Immediate referral of the case of any trader fined by a Magistrates Court to the European Commission on Human Rights under Article 10 of the European Convention on Human Rights - the right to "freedom of expression". UKIP says that Article 10 guarantees the right of traders to express their cultural tradition and identity by continuing to sell to British Customers in traditional, Imperial measures.

For Further Enquiries:Please contact Jeffrey Titford and his team at his Chelmsford Constituency Office - address above - Tel: Chelmsford (01245)

266466 or 251651; Fax: (01245) 252071, or e-mail ukipeast@globalnet.co.uk.

We can also supply information about local UKIP branches in your area.

Legal Note: Trading Standards Officers claim that the Weights and Measures (Units of Measurement) Regulations 1994 make it a criminal offence to sell in Imperial measures. There are separate fines of £,000 and £35,000 for those held to be in breach of these Regulations. Michael Shrimpton, expert barrister on constitutional issues advises that these Regulations are *ultra vires* and can safely be ignored. Further details about the legal position will be given on request. Tony Bennett, Jeffrey Titford's Political Assistant, is also a qualified solicitor.

U.K. Independence Party - The only Party telling you the truth about the European Union.

❁   ❁   ❁

JOTTINGS

In July our Website Committee held a meeting in preparation for our new website.

In attendance were Vice President John Earnest, co-chair, President Jay Schiffman, ex-officio, Secretary Christina Scalise, and Board Chair Professor Gene Zirkel. Excused were Director Chris Harvey, co-chair, Treasurer Professor Alice Berridge and Director Dr. John Impagliazzo.

The committee reports that the transition from our current temporary web page to a new permanent site is progressing nicely. There is hope that it will be up and running by the time of our Annual Meeting in October.

WHY CHANGE?

This same question was probably rife in Europe between the years 1000 and 1500, when the new Hindu-Arabic numerals were slowly making their inching progress in displacing the comfortable and familiar Roman numerals then universally used.

Yet, although it took D years, and despite much opposition--("Who needs a symbol for nothing?")--the new notation did come into popular use. Released from the drag of Roman notation, people's thinking leapt forward dramatically, and mathematicians discovered a new dimension in mathematical symbolism. Working with Hindu-Arabic numeration, they found that the new system better accommodated mathematical statements and facilitated the working out of ideas. Re-examining their fundamental concepts of numbers, they made advances in arithmetic, algebra, logarithms, analytic geometry and calculus, and thus contributed to the explosion of human thought which later became known as the Renaissance. Then, in a related development, people awoke to the fact that different number bases could be used.

A parallel to today seems tenable. The notation of the dozen base better accommodates mathematical statement and facilitates ideation. It, too, is a step forward in numerical symbolism. The factorable base is preferred for the very same advantages which led the carpenter to divide the foot into twelve inches, the baker and the grocer (one who deals in *grosses*) to sell in dozens, the chemist and the jeweler to subdivide the Troy pound into twelve ounces. And yet, this is accomplished by such simple means that students in the primary grades can tell why they are better. Literally, the decimal base is unsatis**FACTOR**y because it has **NOT ENOUGH FACTORS**.

Then should we change? Yes, but no change should be forced, and we urge no mandated change. All the world counts in tens. But people of understanding should learn to use duodecimals to facilitate their thinking, their computations and their measurings. Base twelve should be man's second mathematical language. It should be taught in all the schools. In any operation, the most advantageous base should be used, the one best suited to the task at hand. (Similar to computer scientists use of binary, hexadecimal or octal - whichever is most convenient.) If this were done, duodecimals would progressively earn their way into general popularity because they simplify the all-important problem of the correlation of weights and measures, the expansion of fractions (1/3 = 0;4) and give an advantage in calculations involving time and our twelve-month calendar. Perhaps by the year 2000, (or maybe by 1200; which is 14; years later!) duodecimals may be the more popular base. But then no change need be made, because people will already be using the more convenient base.

If "playing with numbers" has sometimes fascinated you, if the idea of experimenting with a new number base seems intriguing, if you think you might like to be one of the adventurers along new trails in a science which some have erroneously thought staid and established and without new trails, then whether you are a professor of mathematics of international reputation, or merely an interested pedestrian who can add and subtract, multiply and divide, your membership in the Society may prove mutually profitable, and is most cordially invited. □

YOU ARE INVITED TO JOIN THE DOZENAL SOCIETY OF AMERICA
The only requirement is a constructive interest in duodecimals

Name _____ / __ /__
     Last   First   Middle   Date
Mailing Address (including full 9 digit ZIP code)

_____

_____

_____

Phone: Home _____ Business _____

       Fax _____ E-mail _____

Business or Profession _____

Annual Dues .... Twelve Dollars (US)
Life .... One Gross Dollars (US)
Student (Enter data below) .... Three Dollars (US)
(A limited number of free memberships are available to students)

   School _____

   Address _____

   Year & Math Class _____

   Instructor _____ Dept. _____

   College Degrees _____

Other Society Memberships _____

To facilitate communication do you grant permission for your name, address & phones to be furnished to other members of our Society?
Yes: No:

        Please include on a separate sheet your particular duodecimal interests, comments, and other suggestions.

Mail to: Dozenal Society of America
                °/₀ Math Department
                Nassau Community College
                Garden City LI NY 11530-6793

DETACH--HERE--OR--PHOTOCOPY